

Appl. No.: 09/857,635
Amendment Under 37 C.F.R. § 1.116 dated January 4, 2006
Reply to Office Action of May 11, 2005

Amendments to the Claims

The "Listing of Claims" replaces all prior versions of claims in the application.

Listing of Claims:

1-10. (Cancelled).

11. (Currently amended) A composition comprising:

(a) an aqueous silica sol, wherein the composition contains SiO_2 in an amount of from 2 to 40% by weight based upon the weight of the composition; and

(b) from 0.01 to 400 ppm of a hardness stabilizer selected from the group consisting of aminotris(methylenephosphonic acid), 1-hydroxyethane-1,1-diphosphonic acid, phosphonobutane tricarboxylic acid, ~~polyacrylic acid~~, and mixtures thereof.

12-14. (Cancelled).

15. (Currently Amended) The composition according to claim ~~42~~ 34, wherein the aqueous silica sol comprises amorphous silica particles having surface-stabilizing hydroxyl groups.

16. (Cancelled).

17. (Previously Presented) The composition according to claim 11, wherein the hardness stabilizer is present in an amount of from 0.1 to 200 ppm.

18. (Previously presented) The composition according to claim 11, wherein the hardness stabilizer is present in an amount of from 1 to 100 ppm.

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19. (Cancelled).

20. (Currently Amended) The composition according to claim ~~42~~ 34, wherein the hardness stabilizer is present in an amount of from 0.1 to 200 ppm.

21. (Previously Presented) A method of sealing and/or consolidating loose and/or permeable materials, said method comprising:

- (a) providing a material to be treated selected from the group consisting of rocks, mantle rock, soils, and mixtures thereof;
- (b) contacting the material with an aqueous silica sol; and
- (c) contacting the material with a hardness stabilizer selected from the group consisting of inorganic polyphosphates, phosphonic acids, aminoethylene phosphonic acids, phosphoric acid esters, phosphonocarboxylic acids, polycarboxylics, and mixtures thereof, wherein the hardness stabilizer is present in the composition in an amount of from 0.01 to 400 ppm.

22. (Previously Presented) The method according to claim 21, wherein the material is contacted with the aqueous silica sol and the hardness stabilizer simultaneously in the form of a water-based composition comprising both the aqueous silica sol and the hardness stabilizer.

23. (Previously Presented) The method according to claim 21, wherein the material is contacted with the aqueous silica sol, and subsequently contacted with the hardness stabilizer by adding the hardness stabilizer to the aqueous silica sol.

24. (Previously Presented) The method according to claim 21, wherein the aqueous silica sol comprises amorphous silica having an average particle size of from 1 to 150 nm and a specific surface value of from 50 to 700 m²/g.

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25. (Previously Presented) The method according to claim 21, wherein the aqueous silica sol comprises amorphous silica having an average particle size of from 5 to 70 nm and a specific surface value of from 50 to 700 m²/g.

26. (Previously Presented) The method according to claim 21, wherein the aqueous silica sol comprises amorphous silica particles having surface-stabilizing hydroxyl groups.

27. (Previously Presented) The method according to claim 21, wherein the hardness stabilizer is selected from the group consisting of aminotris(methylenephosphonic acid), 1-hydroxyethane-1,1-diphosphonic acid, phosphonobutane tricarboxylic acid, polyacrylic acid and mixtures thereof.

28. (Cancelled).

29. (Previously Presented) The method according to claim 23, wherein the hardness stabilizer is added to the aqueous silica sol such that the hardness stabilizer is present in the sol in an amount of from 0.01 to 400 ppm.

30. (Previously Presented) The method according to claim 22, wherein the hardness stabilizer is present in the composition in an amount of from 0.1 to 200 ppm.

31. (Previously Presented) The method according to claim 23, wherein the hardness stabilizer is added to the aqueous silica sol such that the hardness stabilizer is present in the sol in an amount of from 0.1 to 200 ppm.

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32. (Previously Presented) A method of sealing and/or consolidating loose and/or permeable materials, said method comprising:

(a) providing a material to be treated selected from the group consisting of rocks, mantle rock, soils, and mixtures thereof, wherein the material is in contact with water containing Ca^{2+} ions; and

(b) contacting the material with a composition comprising: (i) an aqueous silica sol, wherein the composition contains SiO_2 in an amount of from 2 to 40% by weight based upon the weight of the composition; and (ii) from 0.1 to 200 ppm of a hardness stabilizer selected from the group consisting of aminotris(methylenephosphonic acid), 1-hydroxyethane-1,1-diphosphonic acid, phosphonobutane tricarboxylic acid, polyacrylic acid and mixtures thereof.

33. (Previously Presented) A method of sealing and/or consolidating loose and/or permeable materials, said method comprising:

(a) providing a material to be treated selected from the group consisting of rocks, mantle rock, soils, and mixtures thereof;

(b) contacting the material with an aqueous silica sol; and

(c) contacting the material with a hardness stabilizer selected from the group consisting of aminotris(methylenephosphonic acid), 1-hydroxyethane-1,1-diphosphonic acid, phosphonobutane tricarboxylic acid, polyacrylic acid, and mixtures thereof.

34. (New) A composition comprising:

(a) an aqueous silica sol comprising amorphous silica having an average particle size of from 1 to 150 nm and a specific surface value of from 50 to 700 m^2/g , wherein the composition contains SiO_2 in an amount of from 2 to 40% by weight based upon the weight of the composition; and

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(b) from 0.01 to 400 ppm of a hardness stabilizer selected from the group consisting of aminotris(methylenephosphonic acid), 1-hydroxyethane-1,1-diphosphonic acid, phosphonobutane tricarboxylic acid, polyacrylic acid and mixtures thereof.

35. (New) A composition comprising:

(a) an aqueous silica sol comprising amorphous silica having an average particle size of from 5 to 70 nm and a specific surface value of from 50 to 700 m²/g, wherein the composition contains SiO₂ in an amount of from 2 to 40% by weight based upon the weight of the composition; and

(b) from 0.01 to 400 ppm of a hardness stabilizer selected from the group consisting of aminotris(methylenephosphonic acid), 1-hydroxyethane-1,1-diphosphonic acid, phosphonobutane tricarboxylic acid, polyacrylic acid and mixtures thereof.

36. (New) A composition comprising:

(a) an aqueous silica sol comprising amorphous silica particles having surface-stabilizing hydroxyl groups, the particles having an average particle size of from 1 to 150 nm and a specific surface value of from 50 to 700 m²/g, wherein the composition contains SiO₂ in an amount of from 2 to 40% by weight based upon the weight of the composition; and

(b) from 0.01 to 400 ppm of a hardness stabilizer selected from the group consisting of aminotris(methylenephosphonic acid), 1-hydroxyethane-1,1-diphosphonic acid, phosphonobutane tricarboxylic acid, polyacrylic acid and mixtures thereof.

37. (New) The composition according to claim 35, wherein the aqueous silica sol comprises amorphous silica particles having surface-stabilizing hydroxyl groups.

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38. (New) The composition according to Claim 11, wherein the hardness stabilizer comprises a mixture of aminotris(methylenephosphonic acid), 1-hydroxyethane-1,1-diphosphonic acid and polyacrylic acid.